REMARKS

This correspondence is responsive to the Official Action mailed February 9, 2005 ("OA#4"), the fourth non-final action issued by the Examiner in this case. Claims 1-15 were examined and remain pending. The Examiner rejected claims 1-15 under 35 USC § 103(a) as obvious over U.S. Patent No. 5,815,222 ("Matsuda") in view of prior art figures 1-5 in applicant's specification. Applicant respectfully traverses the rejection.

The Examiner states first that "*Matsuda teaches a method for driving a segmented pi-cell modulator in a stereoscopic viewing system . . . .*" (OA#4 at p. 2). However, the Examiner is mistaken in this basic premise. Matsuda does not teach or suggest a modulator, nor the use of ***pi-cell*** liquid crystal material for the modulator, much less a segmented pi-cell modulator, as is explicitly required by independent claims 1, 6 and, 11. To the contrary, Matsuda discloses a light deflecting apparatus which explicitly requires a ***nematic*** liquid crystal material. As is well known, the physical and optical properties of twisted nematic cells are significantly different than those of surface mode or pi-cells. As described in the background of applicant's disclosure, the operation of a nematic LC device is due to optical activity when light traverses the bulk of the LC material. A pi-cell, however, operates due to a phase shift created by retardation at or near the surface layer. It is this phase shift that enables the pi-cell to modulate light, rather than deflect it. The problems and solutions associated with one type of LC material are not necessarily common or even relevant to the problems and solutions associated with the other type of LC material.

This is borne out by Matsuda's disclosure. At the very beginning of the detailed description, Matsuda describes "variable grating mode" ("V.G.M."), a phenomenon that appears with use of a ***nematic*** liquid crystal material and an appropriate applied voltage. (Matsuda at col. 12:19-42). Matsuda goes on to note that "the present invention makes us of the V.G.M. phenomenon." *Id.*

Thus, Matsuda teaches away from use of a ***pi-cell*** liquid crystal material by explicitly requiring use of a ***nematic*** liquid crystal material. There is certainly no teaching or suggestion anywhere in Matsuda that the V.G.M. phenomenon appears with the use of a pi-cell liquid crystal material, and in fact, it does not. As noted above, a nematic cell operates to deflect light, whereas a pi-cell operates to modulate light. More importantly, a liquid crystal whose anisotropy of a permittivity is less than zero is cannot be a pi cell. A pi-cell is a liquid crystal cell whose anisotropy of a permittivity must be more than zero. Matsuda states that "[i]n the apparatus for deflecting light

of the present invention, the liquid crystal whose anisotropy of a permittivity is less than 0 is ideal." (Matsuda at col. 4:20-23). Thus, Matsuda explicitly teaches away from use of a pi-cell.

Matsuda's system uses the liquid crystal cell as an electrically controllable, variable pitch, diffraction grating. The function is to physically steer light through different portions of a cylindrical lens array to create an autostereoscopic image. This requires the use of a liquid crystal material with a negative dielectric anisotropy and perpendicular molecular alignment on the substrates. The periodicity of the grating can be continuously varied and is controlled by varying the amplitude of the applied voltage. The electrode on one of the cell substrates consists of a series of transparent, electrically conductive stripes. Many stripes per inch are required (on the order of 100) to form the diffraction grating. The space between the stripes is on the order of the stripe width. This is required to make the periodicity of the stripes variable. The viewer does not need to wear any form of glasses to see the 3D image.

In contrast, applicant's system uses a pi-cell to modulate polarization so as to create a stereoscopic image that requires the viewer to wear polarized glasses. The liquid crystal material in a pi-cell has a positive dielectric anisotropy. The molecular alignment on the substrates is substantially parallel to the substrates. The cell nominally operates between two voltage states. The low voltage state results in a retardation of ½ lambda and serves to rotate the axis of linear polarization of light transmitted through the cell by 90 degrees. The high voltage state results in a retardation of 0 lambda and does not effect the axis of linear polarization of light transmitted through the cell. The electrode segmentation on one of the substrates has a width on the order of inches. In fact, the entire cell has only (about) 7 segments. Furthermore, the space between the electrode segments is made as small as possible to render it less visible.

Applicant's independent claims 1, 6 and 11 each reflect this fundamental difference. For example, claims 1 and 6 are method claims, and the preamble of each recites "a segmented pi-cell modulator." Claim 11 is an apparatus claim that positively recites "a segmented pi-cell modulator" as one of the claim elements. Because Matsuda does not teach or suggest use of such a device, and in fact teaches away from it, the Examiner has failed to make a *prima facie* case for obviousness, and for that reason, all claims are believed to be patentable.

The Examiner also states that Matsuda teaches "applying a unipolar-carrier waveform . . . to the pi-cell" but notes that Matsuda does not specifically teach that the waveform is alternating, and then cites applicant's Fig. 5 as providing that teaching. As noted above, the Examiner is mistaken in

concluding that Matsuda applies any of its waveforms to a pi-cell. Matsuda is concerned with driving a nematic liquid crystal material. Because the physical and optical response of nematic LC's are different than those of surface mode or pi-cell LC's, it would not obvious to one of ordinary skill to take a typical driving waveforms for one type of LC and apply it to a second type of LC, as the Examiner has suggested would be routine. Further, there is no suggestion or motivation either explicitly or implicitly that it would make sense to modify a driving waveform for a nematic LC to imbue it with certain features of a driving waveform for a pi-cell LC. In addition, the Examiner has not established that it would be routine to apply a unipolar carrier waverform to drive a pi-cell LC.

Each of independent claims 1 and 11 explicitly require a "unipolar carrier waveform." Independent claim 6 explicitly requires a first carrier signal that does not change polarity and a second carrier signal that does not change polarity, each signal having the opposite polarity. Because the Examiner has not established that it would be routine to apply a unipolar carrier to the pi-call LC, applicant believes that each of its independent claims are patenable over the cited combination for this reason as well. Each of the dependent claims are patentable since the independent claims are patentable.

For all the foregoing reasons, applicant submits that the claims are in condition for allowance and requests reconsideration to that end.

Respectfully submitted,
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